

# Lecture Notes in Business Information Processing

11

## Series Editors

Wil van der Aalst

*Eindhoven Technical University, The Netherlands*

John Mylopoulos

*University of Trento, Italy*

Norman M. Sadeh

*Carnegie Mellon University, Pittsburgh, PA, USA*

Michael J. Shaw

*University of Illinois, Urbana-Champaign, IL, USA*

Clemens Szyperski

*Microsoft Research, Redmond, WA, USA*

Richard F. Paige   Bertrand Meyer (Eds.)

# Objects, Components, Models and Patterns

46th International Conference, TOOLS EUROPE 2008  
Zurich, Switzerland, June 30–July 4, 2008  
Proceedings



Springer

## Volume Editors

Richard F. Paige  
University of York  
Department of Computer Science, York, UK  
E-mail: [paige@cs.york.ac.uk](mailto:paige@cs.york.ac.uk)

Bertrand Meyer  
ETH Zurich  
Department of Computer Science, Zurich, Switzerland  
E-mail: [Bertrand.Meyer@inf.ethz.ch](mailto:Bertrand.Meyer@inf.ethz.ch)

Library of Congress Control Number: 2008929604

ACM Computing Classification (1998): D.2, H.1, K.6

|         |   |
|---------|---|
| ISSN    | 1865-1348   |
| ISBN-10 | 3-540-69823-X Springer Berlin Heidelberg New York     |
| ISBN-13 | 978-3-540-69823-4 Springer Berlin Heidelberg New York |

This work is subject to copyright. All rights are reserved, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, re-use of illustrations, recitation, broadcasting, reproduction on microfilms or in any other way, and storage in data banks. Duplication of this publication or parts thereof is permitted only under the provisions of the German Copyright Law of September 9, 1965, in its current version, and permission for use must always be obtained from Springer. Violations are liable to prosecution under the German Copyright Law.

Springer is a part of Springer Science+Business Media  
[springer.com](http://springer.com)

© Springer-Verlag Berlin Heidelberg 2008  
Printed in Germany

Typesetting: Camera-ready by author, data conversion by Scientific Publishing Services, Chennai, India  
Printed on acid-free paper      SPIN: 12282777      06/3180      5 4 3 2 1 0

# Preface

The TOOLS conference series started in 1989 and, over the following 15 years, held 45 sessions: TOOLS EUROPE, TOOLS USA, TOOLS PACIFIC, TOOLS CHINA and TOOLS EASTERN EUROPE. TOOLS played a major role in the spread of object-oriented and component technologies; many seminal software concepts now taken for granted were first discussed at TOOLS, taking advantage of the informal, application-oriented, technically intense and marketing-free atmosphere of the conference. Invited speakers have included countless luminaries of science and industry.

After an interruption of four years, TOOLS started again in June 2007, hosted by ETH Zurich with great success. TOOLS has broadened its scope beyond the original topics of object technology and component-based development to encompass all modern, practical approaches to software development. In doing so, it kept with the traditional TOOLS spirit of technical excellence, focus on practicality, combination of theory and applications, and reliance on the best experts from academia and industry.

The 2008 edition of the conference was again held at ETH Zurich, and continued to reflect TOOLS's fundamental tradition. This year, TOOLS was co-located with two other distinct-but-related conferences: the International Conference on Model Transformation (ICMT), with a strong focus on model-driven engineering and, in particular, model transformation technology and theory; and the International Conference on Software Engineering for Offshore and Outsourced Development (SEAFOOD). This co-location, combined with three excellent workshops (on Web 2.0 Pattern Mining, Business Support and MDA, and FAMIX and Moose in Software Engineering) and five tutorials, gave the TOOLS week an unparalleled program of practical and theoretical talks, and a fantastic opportunity for researchers and practitioners in software development to network.

The TOOLS week of conferences was further distinguished by a number of excellent keynote speakers: Michael Brodie (Verizon), John Mylopoulos (University of Trento and the University of Toronto), Erik Meijer (Microsoft), and the ICMT keynote speaker Krzysztof Czarnecki (University of Waterloo). These speakers reflect the TOOLS themes of practicality, combination of theory and application, and substantial expertise.

This volume includes the 21 fully refereed and revised papers accepted by the TOOLS Program Committee. The committee received 58 submissions, a total slightly lower than the previous TOOLS conference, but offset by the submissions received by the co-located events. All told, submission to all three conferences held in the TOOLS week totalled 149, and the overall acceptance rate at these three conferences was 33%.

The 46th TOOLS conference was the result of the hard work of many hundreds of people, including the Program Committee and additional reviewers who

worked hard – and to somewhat unrealistic deadlines! – to select papers, offer feedback and advice, and to ensure that the technical quality that TOOLS is known for was upheld. The Organizing Committee worked hard to schedule all the events (a complicated undertaking in itself!) We would like to thank everyone for their invaluable contributions.

June 2008

Richard Paige

# Organization

TOOLS EUROPE 2008 was organized by the Chair of Software Engineering, ETH Zurich, Switzerland.

## Executive Committee

|                      |   |
|----------------------|---|
| Conference Chair     | Bertrand Meyer (ETH Zurich, Switzerland)                      |
| Program Chair        | Richard Paige (University of York, UK)                        |
| Publicity Chairs     | Laurence Tratt (University of Bournemouth, UK)                |
|                      | Philippe Lahire (Université de Nice Sophia-Antipolis, France) |
| Workshop Chairs      | Stéphane Ducasse (INRIA Lille, France)                        |
|                      | Alexandre Bergel (INRIA Lille, France)                        |
| Tutorial Chairs      | Phil Brooke (University of Teesside, UK)                      |
|                      | Manuel Oriol (ETH Zurich, Switzerland)                        |
| Organizing Committee | Claudia Günthart, Manuel Oriol, Marco Piccioni                |

## Program Committee

|                       |                     |
|-----------------------|---------------------|
| Patrick Albert        | Martin Gogolla      |
| Uwe Assmann           | Jeff Gray           |
| Balbir Barn           | Pedro Guerreiro     |
| Michael Barnett       | Alan Hartman        |
| Claude Baudoin        | Valerie Issarny     |
| Bernhard Beckert      | Gerti Kappel        |
| Jean Bézivin          | Joseph Kiniry       |
| Jean-Pierre Briot     | Ivan Kurtev         |
| Phil Brooke           | Philippe Lahire     |
| Marsha Chechik        | Ralf Lämmel         |
| Dave Clarke           | Mingshu Li          |
| Bernard Coulette      | Tiziana Margaria    |
| Jin Song Dong         | Erik Meijer         |
| Gregor Engels         | Peter Müller        |
| Patrick Eugster       | David Naumann       |
| José Fiadeiro         | Oscar Nierstrasz    |
| Judit Nyekyne Gaizler | Manuel Oriol        |
| Benoît Garbinato      | Jonathan Ostroff    |
| Carlo Ghezzi          | Alfonso Pierantonio |
| Martin Glinz          | Awais Rashid        |

Nicolas Rouquette  
Anthony Savidis  
Doug Schmidt  
Bran Selic  
Anatoly Shalyto  
Jim Steel

Dave Thomas  
Laurence Tratt  
T.H. Tse  
Antonio Vallecillo  
Amiram Yehudai  
Andreas Zeller

## Additional Reviewers

Hakim Belhaouari  
Thorsten Bormer  
Sebastian Cech  
Chunqing Chen  
Fabian Christ  
Antonio Cicchetti  
Duc-Hanh Dang  
Fintan Fairmichael  
Alexander Foerster  
Christoph Gladisch  
Orla Greevy  
Radu Grigore  
Baris Güldali  
Florian Heidenreich  
Mikolas Janota  
Horst Kargl  
Andrei Kirshin  
Vladimir Klebanov

Dimitrios Kolovos  
Hervé Leblanc  
Thomas Ledoux  
Adrian Lienhard  
Hermann Pehl  
Nadia Polikarpova  
Lukas Renggli  
Jose E. Rivera  
Louis Rose  
Julia Rubin  
Davide Di Ruscio  
David Röthlisberger  
Bruno Silvestre  
Arndt Von Staa  
Jun Sun  
Faraz Ahmadi Torshizi  
Manuel Wimmer  
Steffen Zschaler

# Table of Contents

|   |     |
|---|-----|
| The End of the Computing Era: Hephaestus Meets the Olympians<br>(Abstract) .....              | 1   |
| <i>Michael L. Brodie</i>  |     |
| Modeling of Component Environment in Presence of Callbacks and<br>Autonomous Activities ..... | 2   |
| <i>Pavel Parizek and Frantisek Plasil</i>   |     |
| Efficient Model Checking of Networked Applications .....                                      | 22  |
| <i>Cyrille Artho, Watcharin Leungwattanakit, Masami Hagiya, and<br/>Yoshinori Tanabe</i>      |     |
| Controlling Accessibility in Agile Projects with the Access Modifier<br>Modifier .....        | 41  |
| <i>Philipp Bouillon, Eric Großkinsky, and Friedrich Steimann</i>                              |     |
| Towards Raising the Failure of Unit Tests to the Level of<br>Compiler-Reported Errors .....   | 60  |
| <i>Friedrich Steimann, Thomas Eichstädt-Engelen, and Martin Schaaf</i>                        |     |
| Virtual Machine Support for Stateful Aspects .....  | 80  |
| <i>Yuri Phink and Amiram Yehudai</i>  |     |
| Guarded Program Transformations Using JTL .....   | 100 |
| <i>Tal Cohen, Joseph (Yossi) Gil, and Itay Maman</i>  |     |
| A Multiparadigm Study of Crosscutting Modularity in Design<br>Patterns .....                  | 121 |
| <i>Martin Kuhlemann, Sven Apel, Marko Rosenmüller, and<br/>Roberto Lopez-Herrejon</i>         |     |
| Representing and Operating with Model Differences .....                                       | 141 |
| <i>José E. Rivera and Antonio Vallecillo</i>  |     |
| Optimizing Dynamic Class Composition in a Statically Typed<br>Language .....                  | 161 |
| <i>Anders Bach Nielsen and Erik Ernst</i>   |     |
| Ownership, Uniqueness, and Immutability .....   | 178 |
| <i>Johan Östlund, Tobias Wrigstad, Dave Clarke, and<br/>Beatrice Åkerblom</i>                 |     |
| Object Incompleteness and Dynamic Composition in Java-Like<br>Languages .....                 | 198 |
| <i>Lorenzo Bettini, Viviana Bono, and Betti Venneri</i>                                       |     |



|   |     |
|---|-----|
| The Meta in Meta-object Architectures . . . . .   | 218 |
| <i>Marcus Denker, Mathieu Suen, and Stéphane Ducasse</i>  |     |
| An AsmL Semantics for Dynamic Structures and Run Time<br>Schedulability in UML-RT . . . . .                 | 238 |
| <i>Stefan Leue, Alin Ştefănescu, and Wei Wei</i>  |     |
| Component Reassembling and State Transfer in MADCAR-Based<br>Self-adaptive Software . . . . .               | 258 |
| <i>Guillaume Grondin, Noury Bouraqadi, and Laurent Vercouter</i>  |     |
| A Comparison of State-Based Modelling Tools for Model Validation . . . .                                    | 278 |
| <i>Emine G. Aydal, Mark Utting, and Jim Woodcock</i>  |     |
| MontiCore: Modular Development of Textual Domain Specific<br>Languages . . . . .                            | 297 |
| <i>Holger Krahn, Bernhard Rumpe, and Steven Völkel</i>  |     |
| Proof-Transforming Compilation of Eiffel Programs . . . . .   | 316 |
| <i>Martin Nordio, Peter Müller, and Bertrand Meyer</i>  |     |
| Engineering Associations: From Models to Code and Back through<br>Semantics . . . . .                       | 336 |
| <i>Zinoviy Diskin, Steve Easterbrook, and Juergen Dingel</i>  |     |
| On the Efficiency of Design Patterns Implemented in C# 3.0 . . . . .  | 356 |
| <i>Judith Bishop and R. Nigel Horspool</i>  |     |
| A Framework for Model Transformation By-Example: Concepts and<br>Tool Support . . . . .                     | 372 |
| <i>Michael Strommer and Manuel Wimmer</i>   |     |
| Web Applications Design and Development with WebML and<br>WebRatio 5.0 . . . . .                            | 392 |
| <i>Roberto Acerbis, Aldo Bongio, Marco Brambilla, Stefano Butti,<br/>Stefano Ceri, and Piero Fraternali</i> |     |
| <b>Author Index</b> . . . . .   | 413 |